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AGRICULTURAL EXPERIMENT STATION,
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Poultry Experiments.

BY J. H. STEWART AND HORACE ATWOOD.

[The Bulletins and Reports of this Station will be mailed free to any citizen of West Virginia upon written application. Address Director of Agricultural Experiment Station, Morgantown, W. Va.]

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POULTRY EXPERIMENTS.

The results of two year's work with poultry are reported here. The first series of experiments began November 24th, 1897. and was continued for seven periods of thirty days each, and the second series began October 19th, 1898, and were conducted for the same length of time. The principal questions which were studied are as follows:

1. The effect of nitrogenous and carbonaceous rations when fed to laying hens.
2. Floored versus unfloored houses for poultry.
3. The effect of the age of the fowls upon egg production.

A STUDY OF THE EFFECT OF NITROGENOUS AND CARBONACEOUS RATIONS WHEN FED TO LAYING HENS.

(Experiments in 1897-98).

Among the many practical problems connected with the poultry industry, there is none of greater importance than that concerned with the nature and proper quantity of food necessary for laying hens, and although this question lies at the very foundation of successful poultry culture. yet it has never been investigated with sufficient care and attention.

There are two great classes of foods: One containing a large amount of carbon, of which corn is an example, and the other a relatively large amount of nitrogen, like wheat or lean meat. The following experiment was planned in order to study the effect of these two classes of food upon the health of the fowls: the cost of the ration; the egg yield; the fertility and vitality of the eggs; and the strength, vigor, and sex of the resulting chickens.

Three breeds of fowls were selected; White Leghorns, which are noted as being excellent layers, Light Brahmas, one of the heavy meat breeds, and Rhode Island Reds, a newly established, general purpose breed, combining size and good laying qualities. Each breed was divided into two similar lots, which were placed under exactly identical conditions. except the food supplied to them.

The fowls were weighed at the beginning of the experiment and at the end of each period of thirty days thereafter, and an accurate record was kept of the kind, amount, and total cost of food consumed during each period. and the number and average weight of the eggs laid. Incidentally, too, the net profit resulting from using the different foods was determined.

Several hundred eggs from the nitrogenous and carbonaceous fed fowls were hatched in incubators, and the effect of the food upon the behavior of the eggs during incubation was carefully noted.

The following table shows the breed and number of fowls in each pen during the experiment, but in all cases the results have been calculated for 100 fowls in each pen. so that comparisons between the different breeds and pens can be easily instituted.

Pen	Breed	Ration	Number of hens.	Number of cocks
1	White Leghorn	Nitrogenous	18	2
2	Light Brahma	"	12	1
3	Rhode Island Red	"	9	1
4	White Leghorn	Carbonaceous	18	2
5	Light Brahma	"	12	1
6	Rhode Island Red	"	9	1

Both the nitrogenous and carbonaceous fowls were fed each morning a ration of ground feed, mixed either with boiled potatoes or steamed clover hay. The grain mixture for the nitrogenous lot consisted of brown middlings, oil meal, ground oats, and corn meal, in varying proportions; while for the carbonaceous lot, corn meal was the principal material. At noon the nitrogenous fowls received a ration of ground fresh meat and bone, which was fed daily at the rate of from five to eight pounds per hundred fowls. At night both lots of fowls were fed all the whole grain that they would eat up clean. consisting of corn, oats, and wheat screenings, the corn predominating for the carbonaceous lot.

The following tables show the amount and kind of food consumed by the different pens during each period of thirty days, calculated for 100 fowls in each pen.

PERIOD I.

Pen	Potatoes	Oil meal	Hom'y feed	Brown middlings	Corn	Oats	Ground fresh bone.	Corn meal
1	161.0	48.9	22.4	60.1	129.5	129.5	158.0	......
2	242.8	75.1	50.3	100.3	232.8	232.8	241.4	......
3	176.0	47.0	28.0	61.0	155.0	155.0	209.0	......
4	186.5	....	....	......	151.5	151.5	......	174.5
5	277.1	....	....	......	267.8	267.8	......	267.1
6	203.0	....	....	......	189.0	189.0	.....	170.0

PERIOD II.

Pen	Potatoes	Oil meal	Homi'y feed	Brown middlings	Corn	Oats	Ground fresh bone	Corn meal
1	107.0	29.8	59.6	59.6	125.0	125.0	112.0	......
2	251.5	78.4	156.9	156.9	273.0	273.0	215.3	......
3	128.0	38.2	76.4	76.4	158.0	158.0	205.0	.....
4	145.5	....	....	......	124.0	124.0	......	215.5
5	294.6	......	....	....	302.3	302.3	.....	462.3
6	159.0	....	....	......	157.0	157.0	.....	201.0

PERIOD III.

Pen	Potatoes	Ground Oats	Hominy feed	Brown middlings	Corn	Oats	Ground fresh bone	Corn meal	Wheat screenings	Steamed clover hay
1	80.0	50.0	50.0	50.0	91.8	91.8	72.0	....	183.7	14.0
2	145.4	92.3	92.3	92.3	140.7	140.7	138.4	....	281.5	21.5
3	81.0	52.3	52.3	52.3	103.2	103.2	144.0	....	206.5	15.0
4	89.0	...	....	...	95.1	95.1	....	168.0	190.2	14.0
5	184.6	....	....	...	151.7	151.7	...	346.1	303.4	21.5
6	119.0	....	....	....	110.7	110.7	....	224.0	221.5	15.0

PERIOD IV.

Pen	Potatoes	Ground oats	Hominy feed	Brown middlings	Corn	Oats	Ground fresh bone	Corn meal	Wheat screenings	Steamed clover hay
1	93.0	62.0	62.0	62.0	112.3	112.3	108.0	....	112.3	15.0
2	152.3	101.5	101.5	101.5	166.6	166.6	169.2	....	166.6	33.0
3	68.0	45.6	45.6	45.6	94.0	94.0	116.0	...	94.0	15.0
4	107.0	....	....	....	256.0	...	....	212.0	32.5	15.0
5	180.0	....	...	...	359.2	....	...	360.0	50.0	33.0
6	88.0	....	....	....	223.0	....	....	178.0	39.0	15.0

PERIOD V.

Pen	Potatoes	Ground oats	Hominy feed	Brown middlings	Corn	Oats	Ground fresh bone	Corn meal	Wheat screenings	Steamed clover hay
1	112.0	70.0	70.0	70.0	92.1	92.1	120.	....	184 2	14.0
2	173.0	107.9	107.9	107.9	135.3	135.3	184.6	..	270.6	32.3
3	69.0	43.0	43.0	43.0	76.0	76.0	120	....	152.0	14.0
4	128.0	....	....	...	285.0	....	....	240.0	. ..	14.0
5	196.9	...	....	. ..	234.6	....	....	369.2	....	32.3
6	90.0	....	....	...	169.0	....	....	150.0	...	14.0

PERIOD VI.

Pen	Potatoes	Ground Oats	Hominy feed	Brown middlings	Corn	Oats	Corn meal	Ground fresh bone.
1	93.3	75.1	75.1	75.1	173.6	173.6	....	88.8
2	129.2	104.1	104.1	104.1	241.5	241.5	....	123.0
3	50.0	40.7	40.7	40.7	124.0	124.0	....	80.0
4	96.0	......	......	.....	180.0	....	232.0	...
5	147.7	......	......	......	246.1	..	344.6	....
6	61.0	......	......	......	169.0	...	148.0	...

PERIOD VII.

Pen	Potatoes	Ground oats	Hominy feed	Brown middlings	Corn	Oats	Corn meal	Ground fresh bone.
1	107.0	82 3	82.3	82.3	139.1	139.1	....	70.5
2	140.0	107.6	107.6	107.6	147.3	147.3	......	92.3
3	97.5	75.0	75.0	75.0	171.8	171.8	....	75.0
4	99.0	.....	...	..	102.7	102.7	218 0	....
5	147.6	....	....	....	136.1	136.1	338.4	....
6	86.6	....	....	..	88.8	88.8	200.0	....

The following table shows the weight of the fowls in the different pens, at the beginning of the experiment, and at the end of each thirty day period. Calculated for 100 fowls in each flock.

Pen	Breed	Ration	Period							End of Period VII.
			I	II	III	IV	V	VI	VII	
1	White Leghorn.	Nitrogenous	322	365	372	360	365	357	361	373
2	Light Brahma .	"	557	709	811	838	896	900	815	781
3	R. I. Red........	"	465	537	560	570	515	505	485	545
4	White Leghorn.	Carbonaceous	317	335	327	337	315	310	287	287
5	Light Brahma..	"	553	688	819	823	769	719	665	657
6	R. I. Red........	"	440	490	470	490	410	405	375	400

As may be seen from the above table, at the beginning of the experiment the three pens of nitrogenous fowls weighed 1344 pounds, and at the end of the seventh period, 1698 pounds. They consequently gained in weight 354 pounds, while the carbonaceous fowls gained only 34 pounds. The fowls fed the nitrogenous ration increased, then, in weight more than ten times as much as the corn-fed lot.

The following table shows the number of eggs laid during the seven different periods, calculated for 100 hens in each pen.

Pen.	Breed.	Ration.	Period.							Total.
			I	II	III	IV	V	VI	VII	
1	White Leghorn.	Nitrogenous ..	128	455	822	1205	1600	1650	1343	7203
2	Light Brahma..	"	none	none	216	550	1325	1250	700	4041
3	R. I. Red.... ...	"	377	466	577	1411	1366	933	1085	6215
4	White Leghorn.	Carbonaceous	133	372	466	766	628	455	572	3392
5	Light Brahma..	"	none	175	358	700	541	225	275	2274
6	R. I. Red.... ...	"	244	844	711	888	544	411	400	4042

During the seven months the three pens of nitrogenous fed fowls, (calculated for 100 fowls in each pen,) laid 17,459 eggs, and the three carbonaceous fed pens, 9,708 eggs, consequently the nitrogenous fowls not only gained much more in weight than the others, but they laid nearly twice as many eggs.

The following table shows the value of the eggs produced by the different lots and also the total value for the seven months. During the first two months the eggs were valued at twenty cents per dozen, and during the last five months at twelve cents per dozen.

Pen.	Breed.	Ration.	Periods.							Total
			I	II	III	IV	V	VI	VII	
1	White Leghorn.	Nitrogenous...	$2.13	$ 7.58	$13.70	$12.05	$16.00	$16.50	$13.43	$81.39
2	Light Brahma..	"	...	....	3.60	5.50	13.25	12.50	7.00	41.85
3	R. I. Red.... ...	"	6.28	7.76	9.61	14.11	13.66	9.33	10.85	71.60
4	White Leghorn.	Carbonaceous.	2.21	6.20	7.76	7.66	6.28	4.55	5.72	40.38
5	Light Brahma..	"	...	2.91	5.96	7.00	5.41	2.25	2.75	26.28
6	R. I. Red........	"	4.06	14.06	11.85	8.88	5.44	4.11	4.00	52.40

The total value of the eggs laid by the nitrogenous fowls was $194.84, and by the carbonaceous fowls, $119.06.

The following table shows the cost of the food eaten by the different lots during each of the seven different periods. The prices used in this calculation were those ruling in our local market, and were as follows:

Small potatoes	20 cts. per bu.
Hominy feed	$14.50 per ton.
Brown middlings	15.00 per ton.
Corn meal	14.50 per ton.
*Ground oats	20.00 per ton.
*Clover hay	5.00 per ton.
Oil meal	25.00 per ton.
Corn	40 cts. per bu.
Oats	32 cts. per bu.
Wheat screenings	50 cts. per cwt.
Fresh bone	25 cts. per cwt.

Pen.	Breed.	Ration.	Periods.							Total
			I	II	III	IV	V	VI	VII	
1	White Leghorn.	Nitrogenous...	$4.35	$4.01	$4.15	$4.63	$4.92	$5.35	$4.78	$32.19
2	Light Brahma..	"	7.45	9.33	6.91	7.18	7.43	7.44	5.68	51.42
3	R. I. Red.... ..	"	5.00	5 22	4.72	3.76	3.69	3.48	5.16	31.03
4	White Leghorn	Carbonaceous.	4.47	4.16	4.12	4.69	4.23	3.28	3.53	28.48
5	Light Brahma..	"	7.44	9.50	7.28	6.10	5.07	4.73	5.07	45.19
6	R. I. Red........	"	5.14	4.67	5.04	3.40	2.62	2.47	3.18	26.52

The nitrogenous ration was somewhat more expensive than the carbonaceous one, as it cost $114.64 to feed the nitrogenous fowls during the seven months, and $100.19 for the carbonaceous fowls.

The following table shows the value of the eggs produced by the nitrogenous and carbonaceous fowls; the value of the gain in live weight, calculated at five cents per pound; the cost of the food, and the net profit resulting from the two different rations.

Pen	Ration	Value of eggs	Value of grain in weight	Gross income	Cost of food	Net profit
1 2 3	Nitrogenous	$194.84	$17.70	$212.54	$114.64	$97.90
4 5 6	Carbonaceous	119.06	1.70	120.76	100.19	20.59

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*During the third period the ground oats were valued at $19.00 per ton; and the clover hay at $6.00 per ton.

The nitrogenous fowls gave more than four times as much net profit, and although they gained much more in weight, yet they laid more eggs than the hens fed the carbonaceous ration.

THE EFFECT OF THE FOOD UPON THE HATCHING OF THE EGGS.

Great care was exercised to have all of the conditions the same when hatching the nitrogenous and carbonaceous eggs. Incubators were divided by a wire screen into two compartments, and the nitrogenous eggs placed on one side of the screen and the carbonaceous eggs on the other, so that both trays of eggs would be under identical conditions during the process of incubation. Four separate lots of eggs were. incubated, and the following table details the results of the work:

Kind of Eggs.	Number of eggs incubated.	Number of infertile eggs.	Number of chicks.	Percent. of fertile eggs hatched.	Percent. of eggs infertile.
Nitrogenous........	459	65	260	66.	14.1
Carbonaceous	446	129	149	47.	28.9

The above table shows that among the carbonaceous eggs the per cent. of infertility was more than twice as great, and that the fertile eggs themselves did not hatch nearly so well as the fertile nitrogenous ones. It was observed, too, that the nitrogenous eggs hatched from six to twelve hours quicker than the carbonaceous eggs in the same incubator. The nitrogenous chicks also were stronger and more vigorous than the carbonaceous ones.

After the feeding experiment had been conducted for some time, it was observed that the carbonaceous eggs were noticeably smaller than the others, and at the end of the fourth period, several dozen eggs from each lot of fowls were carefully weighed and the rusults are shown by the following table.

Pen	Breed	Ration	Weight of 100 eggs	Average wt. of Nitrogenous eggs	Average wt. of Carbonaceous eggs
1	White Leghorn	Nitrogenous	12.08 lbs.	12.68 lbs.	11.57 lbs.
2	Light Brahma	"	13.33 "		
3	R. I. Red	"	12.63 "		
4	White Leghorn	Carbonaceous	11.80 "		
5	Light Brahma	"	11.94 "		
6	R. I. Red.	"	10.97 "		

At this stage of the experiment, then, 100 nitrogenous eggs weighed about one pound more than the same number of carbonaceous ones.

In the case of the Brahmas it was found that the food affected the color of the egg shells as those laid by the nitrogenous fowls had a pinkish tint, while the carbonaceous eggs were of various shades of brown.

CONCLUSION.

Although the nitrogenous ration cost slightly more money, yet it was more profitable because more eggs were laid and the fowls gained more in weight. The eggs from the nitrogenous fed fowls were larger, more fertile, and hatched better and produced far more vigorous chicks than those laid by hens fed the carbonaceous ration. Both lots of fowls remained in a healthy, vigorous condition during the entire test.

THE EFFECT OF NITROGENOUS AND CARBONACEOUS RATIONS WHEN FED TO LAYING HENS.

(Experiment in 1898-99.)

Four pens of White Leghorn fowls were used in these experiments. Pens 1 and 3 were pullets. Pens 2 and 4 were fowls used in the feeding test last year and they received the same ration respectively that they did last year. Each pen consisted of ten hens and one cock, but in all cases the results have been calculated for 100 fowls in each flock, so that comparisons can be readily made.

The fowls were weighed at the beginning of the experiment, and at the end of each thirty day period. At the beginning of each period the food for that period was weighed and stored in boxes which were divided by partitions into several compartments. At the end of each period the food remaining in the boxes was weighed. It was thought that in this way the amount of food consumed could be determined more accurately than where each day's rations were weighed separately.

Each morning the fowls were fed a mash of ground feed, and in the case of the nitrogenous fowls meat meal was added during the first four periods. Ground fresh meat and bone was substituted during the remainder of the experiment. During periods 2, 3 and 4 each of the pens received boiled sugar beets, but as the beets seemed to be making the fowls too fat, they were then dropped from the ration, although the fowls were very fond of them. At night the fowls received all the whole grain they would eat up clean.

The arrangement of the pens and the rations which each flock received is shown below.

Pen.	Breed.		Ration.	No. of pen.	No. of cocks.
1	White Leghorns.	Pullets.	Nitrogenous.	10	1
2	" "	Old fowls.	"	10	1
3	" "	Pullets.	Carbonaceous,	10	1
4	" "	Old fowls.	"	10	1

The following table shows the amount and kind of food consumed by each pen during each period of thirty days. Calculated for 100 fowls in each pen.

PERIOD I.

Pen	Corn meal	Brown middlings	Ground oats	Meat meal	Wheat	Oats	Corn
1	66 6	66,6	66.6	59.1	136.3	136.3	.....
2	109.1	109.1	109.1	72.7	136.3	136.3	. . .
3	81.8	81.8	81.8	....	.. .	.....	272.7
4	90.9	90.9	90.9	....	.....	.....	363.6

PERIOD II.

Pen	Corn meal	Brown middlings	Ground oats	Meat meal	Wheat	Oats	Corn
1	63 6	63.6	63.6	45.4	181.8	181.8	.....
2	65.9	65.9	65.9	43.2	171.5	171.5	. ...
3	81.8	81.8	81.8	....	.....	.....	327.2
4	84.1	84.1	84.1	....	.....	.....	309.1

PERIOD III.

Pen	Corn meal	Brown middlings	Ground oats	Meat meal	Wheat	Oats	Corn
1	90.9	90.9	90.9	36.3	136.3	136.3	.....
2	90.9	90.9	90.9	36.3	118.1	118.1	.....
3	90.9	90.9	90.9	....	.....	.....	259.1
4	90.9	90.9	90.9	....	.....	.....	272.7

PERIOD IV.

Pen	Corn meal	Brown midnlings	Ground oats	Meat meal	Wheat	Oats	Corn
1	54.5	54.5	54.5	23.6	136.3	136.3	.....
2	49.1	49.1	49.1	25.4	136.3	136.3	. ..
3	57.2	57.2	57.2	....	.....	.....	233.6
4	60.0	60.0	60.0	...	....	.....	260. 0

PERIOD V.

Pen	Hominy feed	Wheat Bran	Ground oats	Fresh bone	Wheat	Oats	Corn
1	39.1	79.1	79.1	?	118.1	118.1	118.1
2	30.5	61.0	61.0	?	115.1	115.1	115.1
3	40.0	80.0	80.0		.....	.....	345.4
4	37.8	75.6	75.6		. ...	.....	363.6

PERIOD VI.

Pen	Corn meal	Wheat Bran	Ground oats	Fresh bone	Wheat	Oats	Corn
1	29.1	58.2	58.2	?	136.3	136.3	136.3
2	26.3	52.7	52.7	?	136.3	136.3	136.3
3	37.4	74.8	74.8		....	.....	300.0
4	37.0	74.0	74.0		.....	.....	300.0

PERIOD VII.

Pen	Corn meal	Wheat Bran	Ground oats	Fresh bone	Wheat	Oats	Corn
1	26.0	52.0	52.0	?	121.0	121.0	121.0
2	26.3	52.6	52.6	?	98.2	98.2	98.2
3	37.5	75 0	75.0		.....	.....	306.2
4	29.0	58.0	58.0		.....	.....	295.0

The weight of each pen at the beginning of the experiment and at the end of every thirty day period as shown below. Calculated for 100 fowls in each pen.

WEIGHT OF FOWLS.

Pen	Beginning of period I	Period II	Period III	Period IV	Period V	Period VI	Period VII	End of Period VII
1	227	254	291	286	284	264	275	272
2	304	350	359	354	354	349	312	273
3	213	222	250	264	259	243	259	250
4	263	304	323	359	357	329	310	300

The following table shows the number of eggs laid during the different periods, and the total number. Calculated for 100 fowls in each pen.

EGGS LAID.

Pen	Period 1	2	3	4	5	6	7	Total
1	....	180	280	310	860	1150	1155	3935
2	50	360	260	400	770	1050	730	3620
3	....	10	100	60	70	411	600	1251
4	....	130	70	330	440	688	522	2180

An inspection of the above table shows that the two pens of nitrogenous fowls laid 7555 eggs, while the carbonaceous fowls laid only 3431 eggs, or less than half as many as those receiving the nitrogenous ration. This is entirely in accord with the results obtained last year.

FLOORED *versus* UNFLOORED HOUSES FOR POULTRY.

The poultry house which was owned by the Experiment Station is located upon a clayey hillside which slopes quite sharply to the north-west, and owing to the two factors, insufficient sunlight in winter and poor natural drainage, the fowls which have been kept here have frequently been in an unhealthy condition. At times large numbers of them have died of roup and other diseases.

The poultry house, as first constructed, was floorless, and the fowls were obliged to stand upon the damp clay, either within the house or out in the yards. It was determined to make a comparative test of floored and unfloored pens. Accordingly, all but three of the pens were floored with rough boards, the floor being from two to three feet above the ground.

Three breeds of fowls, Blue Andalusian, Brown Leghorn and Black Langshans, were selected to determine whether they would actually be healthier in the floored pens. The fowls of each breed were separated into two similar lots, one of which was placed in a floored pen, and the other in an unfloored pen.

The composition of the food for the six different flocks was the same. An accurate record was kept of the amount of food eaten; the number of eggs laid; and the weight of the different flocks. The general health of the fowls was also carefully watched. The experiment was conducted for five months, beginning November 24th, 1897, and was discontinued at the end of this period, because the room was needed for other purposes.

The following table shows the breed and number of fowls in each pen during the experiment:

Pen.	Breed	No. Hens	No. Cocks
Floored	Black Langshan	14	1
"	Brown Leghorn	14	2
"	Blue Andalusian	8	2
Unfloored	Black Langshan	14	1
"	Brown Leghorn	14	2
"	Blue Andalusian	8	2

The grain mixtures which were fed varied somewhat in composition during the five different months of the experiment. In all cases, however, the fowls received in the morning, a ration of ground feed, mixed with boiled potatoes or steamed clover hay; at noon, ground fresh meat and bone, and at night, whole grain, consisting of wheat screenings, corn and oats.

The following table gives the average weight of the fowls during the test; the total cost of the food consumed; and the total number and value of the eggs laid during the experiment. The value of the eggs was calculated at the regular maket price, which was, for the first three months, 20 cents per dozen, and for the last two, 12 cents per dozen.

In order to be able to compare at a glance the cost of the food and the value of the eggs produced by the three breeds, the results in all cases have been calculated for 100 fowls in each flock.

Pen	Breed	Average Weight	Cost of food	Number of eggs	Value of eggs	Net profit
Floored	Black Langshan	6.0 lb.	$31.04	1889	$24.88	($6.16 loss)
"	Brown Leghorn	3.1 "	21.60	4287	53.57	31.97
"	Blue Andalusian	3.8 "	25 60	4673	56.55	30.95
Unfloored	Black Langshan	5.9 "	33.10	3379	41.99	8.89
"	Brown Leghorn	3.2 "	21.63	5623	69.83	48.20
"	Blue Andalusian	3.9 "	25.56	4946	58.71	33.15

A study of the preceding table shows several matters of interest to one engaged in the poultry industry.

The heaviest breed was the Langshan; next came the Andalusians; and finally the Leghorns, which weighed only about half as much per fowl as the Langshans.

It is seen, too, that the amount of food consumed corresponds somewhat closely to the average weight of the fowls, as it cost more to keep the Langshans than it did to keep the Andalusians, and still less to keep the Leghorns.

In regard to the egg production, it must be said, injustice to each of the three breeds, that many of the hens were old and in poor condition, and that only after the test had been in operation for two months did they begin to lay in a business-like way.

The total number of eggs laid by the two pens of Langshans, calculated for 100 fowls in each pen, was 5278; by the Leghorns, 9910, and by the Andalusians, 9619. The lighter breeds, then, laid practically the same number of eggs, and left the heavy Langshans far in the rear. The three flocks kept on the floor laid 10859 eggs, while those on the ground laid 13948. This result was quite contrary to expectations, and can be explained only by the fact that the unfloored pens seemed to be somewhat warmer than the others, as the water in the drinking dishes in the floored pens would sometimes freeze, while in the unfloored pens it seldom did so.

Quite contrary to expectations, too, the health of the fowls in the unfloored pens remained almost perfect during the entire test. Only two fowls died of the roup, one from a floored and the other from an unfloored pen, and there was no other sickness of any kind.

In conclusion it may be said that although a single test cannot be considered decisive, and the Station expects to duplicate this work at some future time, yet the results indicate that fowls can be kept equally as well upon the ground as upon a board floor. In building poultry houses it probably would be wise to raise the level of the dirt floor by first applying a course of six or eight inches of cracked stone or gravel, and then covering this with a layer of dirt. Such a floor would always be perfectly day, can be cheaply constructed, and probably would be satisfactory in every way.

EXPERIMENTS IN 1898-99.

These experiments are a continuation of those begun last year and desscribed above. Rhode Island Reds and Light Brahmas were selected for the experiment. The fowls of each breed were separated into two similar lots, one of which was placed in a floored and the other in an unfloored pen. The food and treatment was the same for the different lots. The test began October 19th, 1898, and was continued for four periods of thirty days each. The following table shows the weight of the fowls at the beginning and end of the experiment and the number of eggs laid, calculated for 100 fowls in each pen.

Pen	Breed		Weight at beginning	Weight at end of test	Eggs laid
1	R. I. Reds..	Unfloored.....	368	513	1220
2	Light Brahmas...	Unfloored.....	513	730	0
3	R. I. Reds.	Floored	359	492	1086
4	Light Brahmas...	Floored.......	563	748	0

The Brahmas did not lay during this test, but in justice to the breed it must be said that they began to lay shortly after this test was finished. The Rhode Island Reds in the unfloored pens laid a few more eggs than the flock which was kept upon the board floor, which agrees with the result obtained last year. The health of the fowls was perfect, except in pen 3, where three deaths occurred, but whether these deaths were due to the extremely cold weather which prevailed during a few days of the test, or to other causes could not be determined.

CONCLUSION:—The result of two year's experiment with floored and unfloored houses shows that fowls remain in as healthy condition, and lay as many or more eggs when kept in unfloored houses, as they do when kept in houses provided with floors.

THE EFFECT OF THE AGE OF THE FOWLS UPON EGG PRODUCTION.

One of the important questions connected with the production of eggs is, at what age do fowls become unprofitable? The experiments reported here are merely preliminary and it is planned to continue the study of this question.

White and Brown Leghorn fowls were used. The old White Leghorns were about four years old at the beginning of the test, and the Brown Leghorns about three years old. The experiments with the White Leghorns began October 19, 1898, and were continued for seven periods of thirty days each, and with the Brown Leghorns for four periods. The White Leghorns were the fowls which were used in studying the effect of nitrogenous and carbonaceous rations, and the amount and kind of food consumed during the different periods is shown in the report of that experiment. The Brown Leghorns received practically the same ration as the nitrogeneous White Leghorns.

The arrangement of the pens the weight of the fowls and other details of the experiment are shown in the following table. Calculated for 100 fowls in each pen.

Pen	Breed	Ration	Weight at beginning	Weight at end of test	Eggs laid	Duration of test
1	White leghorn pullets	n	227	272	3935	7 periods
2	White leghorn "	c	213	250	1251	7 periods
3	Brown leghorn "	n	205	266	1023	4 periods
4	White leghorn hens	n	304	273	3620	7 periods
5	White leghorn "	c	263	300	2180	7 periods
6	Brown leghorh "	n	255	333	549	4 periods

The three pens of pullets, calculated for 100 hens in each pen, laid during the experiment 6209 eggs, and the old fowls 6349 eggs. The three pens of pullets gained 143 pounds in weight and the old fowls 84 pounds.

NOTICE.

Application for bulletins of this Station should be addressed to the Director of the West Virginia Agricultural Experiment Station, Morgantown, W. Va.

(The bulletins named below are available for distribution.)

No. 4. The Creamery Industry; Its Adaptability to West Virginia.

No. 5. The Selection of Milch Cows.

No. 6. Six Month's Experience in Running a Creamery; Improved Process of Handling Cream and Churning.

No. 12. The Canada Thistle.

No. 14. Farm and Garden Insects and Experiments with Remedies; Notes of the Season.

No. 15. Raspberry Gouty-Gall Beetle.

No. 16. Yellow Locust, Insect Ravages upon.

No. 17. Black Spruce, Insect Ravages.

No. 19. Your Weeds and Your Neighbor's, Part 1. Weeds as Fertilizers.

No. 20. Potato Culture and Fertilization. Tests of Some Varieties of Tomatoes.

No. 21. Injurious Insects and Plant Diseases.

No. 25. Plat Experiments with Commercial Fertilizers on Wheat.

No. 26. Inspection of Commercial Fertilizers.

No. 27. Notes on Pruning.

No. 28. Plat Experiments with Commercial Fertilizers on Corn.

No. 29. Experiments with Potatoes at the Station. Experiments on Corn at the Out-Stations.

No. 30. Address and Notes on Sheep.

No. 33. Sub-Irrigation in the Green house.

No. 38. Potato Blight, Potato Scab.

No. 40. Commercial Fertilizers.

No. 42. Vegetables.

No. 43. When, Why, What and How to Spray.

No. 44. Practical Entomology.

Special Bulletin No. 2. Proceedings connected with the celebration upon the completion of the Station Building and the organization of the Sheepbreeders and Wool-Growers' Association and the State Horticultural Society.

Third Annual Report, 1890.

No. 51. Commercial Fertilizers, Jan. '98.

No. 52. Strawberries.

No. 53. Commercial Fertilizers, Dec. '98.

No. 54. Nursery Hints.

No. 55. Sugar Beets.

No. 56. Report on Investigations to Determine the Cause of Unhealthy Conditions of the Spruce and Pine From 1880-1893.

No. 57. Commercial Fertilizers.

No. 58. The Effect of Pressure in the Preservation of Milk.

No. 59. Whole Corn Compared with Corn Meal for Fattening Hogs.